

## SAFELY VIEW A TORNADO IN MONTANA... BY MAKING ONE

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At your Northeast Montana get-togethers, you explain to your friends and family how you are a spotter for the National Weather Service. Many of them ooh and ahh as you tell them your weather war stories, like how you were pelted by the golf ball size hail stones that you reported last summer. You even show them some pictures from Skywarn training, or that photo you took of a shelf cloud from when you were driving back from Billings that one time. You show them a couple weather instruments you have in your possession. But there is always that one niece or nephew that simply is not satisfied. They yawn unappreciatively, with eyes darting around for a more exciting venue to satiate their short attention span. How do you compete in this day and age, with computers, DVD's, and video games? With cardboard, duct tape, and plastic wrap.

Here is how to make your own tornado-in-a-box. You'll want to obtain four pieces of cardboard (or four sides of a big cardboard box), roughly of 14-by-28 inch dimensions. For all four pieces, cut a one inch-wide slit about one inch from the right edge. For two of the pieces, cut a sizable square which will be used as a viewing window. Make sure the square is large enough for adequate viewing, yet small enough to maintain the structural integrity of the cardboard. You should end up with something like this:

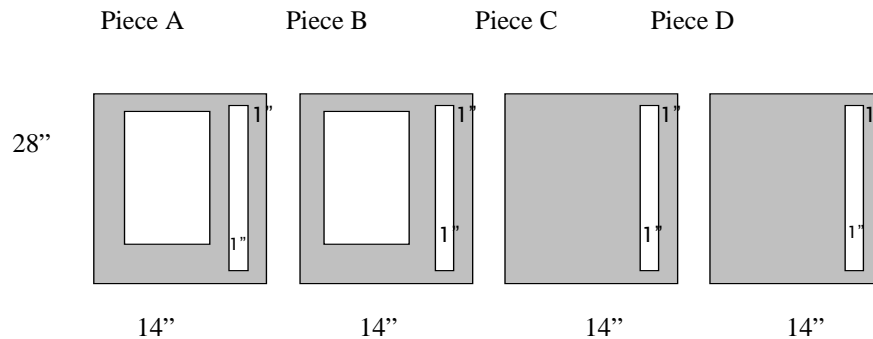


FIGURE 1: FOUR SIDES NEEDED FOR TORNADO-IN-A-BOX

Next, use plastic wrap to cover up the viewing windows. You'll want to affix the plastic, using tape or other means, to prevent air from flowing through the window. Optionally, you may want to also use paint or marker to color the other side of each cardboard piece black – so when the pieces form the box, the inside of it is dark for optimal viewing of the tornado.

Then, using duct tape, connect the four pieces in order (A-B-C-D) to make a four-sided box with the viewing windows on two consecutive sides. The one-inch slits should all be towards the right edge of each side of the box. Looking at the assembled box from the top, the openings should look like Figure 2 (below).

Now, all you need is boiling water. Get a shallow pan of water on a hot plate, or other small boiler of some sort. Place the assembled box over - and around - the soon-to-be-boiling pan of water. Hot air inside the box will begin to rise. As this happens, air from the outside begins to draw in through the one-inch slits to replace the rising air. This produces a circulation, which if viewed from the top, looks like figure 3. Once the water boils, the circulation becomes visible in the form of a "steam tornado." You can make it more dramatic and visible by turning off all lights, then shining a flashlight (or desk lamp, etc.) into the box at an angle from the top.

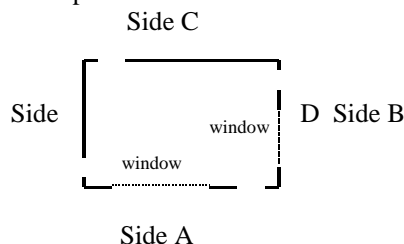


FIGURE 2: ASSEMBLED BOX  
VIEWED FROM THE TOP

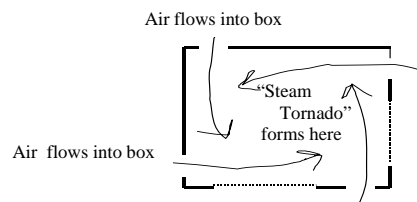


FIGURE 3: CIRCULATION  
VIEWED FROM THE TOP

I'm sure you'll enjoy your own tornado in a box! But one last thing: if you really want to knock their socks off, add dry ice to the water. Dry ice produces the best results, because the very fine vapor that is emitted when mixing water with dry ice. It is very effective for displaying swirling currents inside your box – and the little tornado itself.